

What is claimed is:

Claim 1. A low attenuation optical fiber comprising:

- a dispersion (D) of 2.0 to 14.0 ps/nm/km in absolute value over a wavelength band of 1530 to 1565nm,
- a transmission loss which remains no more than 0.25dB/km at a wavelength of 1520nm under the standard atmospheric conditions,
- wherein said transmission loss at 1520nm does not exceed 0.25dB/km after being exposed, for a sufficient period, to an atmosphere consisting substantially of hydrogen under ordinary atmospheric pressure at ordinary temperature,

Claim 2. The low attenuation optical fiber according to Claim 1, further comprising:

- a dispersion slope (S) of no more than 0.15 ps/nm/km over a wavelength band of 1530 to 1565nm,
- a polarization mode dispersion (PMD) of no more than 0.5 ps/ $\sqrt{\text{km}}$ ; and,
- a loss increase of no more than 40dB/m at a wavelength of 1550nm as coiled in a diameter of 20mm,

Claim 3. The low attenuation optical fiber according to Claim 1, further comprising:

- an effective area ( $A_{\text{eff}}$ ) of no more than 90  $\mu\text{m}^2$  at a wavelength of 1550nm,

Claim 4. The low attenuation optical fiber according to Claim 1, further comprising:

- a dispersion slope of 0.04 ps/nm/km to 0.08 ps/nm/km over a wavelength band of 1530 to 1565nm,
- a dispersion of 6ps/nm/km 10ps/nm/km in absolute value, and
- an effective area of 40  $\mu\text{m}^2$  to 70  $\mu\text{m}^2$  at a wavelength of 1550nm,

Claim 5. The low attenuation optical fiber according to Claim 1, further comprising:

- an effective area of no more than 90  $\mu\text{m}^2$  at a wavelength of 1550nm,

Claim 6. The low attenuation optical fiber according to Claim 2, further comprising

- a dispersion slope of 0.04 ps/nm/km to 0.08 ps/nm/km over a wavelength band of 1530 to 1565nm,
- a dispersion of 6ps/nm/km 10ps/nm/km in absolute value, and
- an effective area of 40  $\mu\text{m}^2$  to 70  $\mu\text{m}^2$  at a wavelength of 1550nm,

Claim 7. A low attenuation optical fiber comprising

a dispersion (D) of 2.0 to 14.0 ps/nm/km in absolute value over a wavelength band of 1530 to 1565nm,  
a transmission loss which remains no more than 0.25dB/km at a wavelength of 1520nm under the standard atmospheric conditions,  
wherein said transmission loss at 1550nm does not exceed 0.25dB/km after being exposed, for a sufficient period, to an atmosphere consisting substantially of hydrogen under ordinary atmospheric pressure at ordinary temperature,

Claim 8. The low attenuation optical fiber according to Claim 7, further comprising:

a dispersion slope (S) of no more than 0.15 ps/nm<sup>2</sup>/km over a wavelength band of 1530 to 1565nm,  
a polarization mode dispersion (PMD) of no more than 0.5 ps/ $\sqrt{\text{km}}$ ; and,  
a loss increase of no more than 40dB/m at a wavelength of 1550nm as coiled in a diameter of 20mm,

Claim 9. The low attenuation optical fiber according to Claim 7, further comprising:

an effective area ( $A_{\text{eff}}$ ) of no more than 90  $\mu\text{m}^2$  at a wavelength of 1550nm,

Claim 10. The low attenuation optical fiber according to Claim 7, further comprising:

a dispersion slope of 0.04 ps/nm/km to 0.08 ps/nm/km over a wavelength band of 1530 to 1565nm,  
a dispersion of 6ps/nm/km 10ps/nm/km in absolute value, and  
an effective area of 40  $\mu\text{m}^2$  to 70  $\mu\text{m}^2$  at a wavelength of 1550nm,

Claim 11. The low attenuation optical fiber according to Claim 8, further comprising:

an effective area of no more than 90  $\mu\text{m}^2$  at a wavelength of 1550nm,

Claim 12. The low attenuation optical fiber according to Claim 8, further comprising

a dispersion slope of 0.04 ps/nm/km to 0.08 ps/nm/km over a wavelength band of 1530 to 1565nm,  
a dispersion of 6ps/nm/km 10ps/nm/km in absolute value, and  
an effective area of 40  $\mu\text{m}^2$  to 70  $\mu\text{m}^2$  at a wavelength of 1550nm,

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Claim 13. A method of hydrogen-proof treatment for low-attenuation optical fibers, wherein said hydrogen-proof treatment is exposure to an atmosphere consisting substantially of deuterium at ordinary temperature and takes place after a fiber drawing process.

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